

Beyond Zero Series: Industrializing Construction

Join the Building Energy Exchange and NYSERDA for a Beyond Zero Series program highlighting innovative and upscaled methods to industrialize the construction of carbon neutral-ready buildings. These replicable and scalable strategies accelerate the construction of carbon neutral-ready buildings, producing high-performing structures with low embodied carbon. Experts will discuss how their methods improve construction efficiency and quality control, while achieving great healthy, comfortable, and resilient buildings.

Opening Remarks

Matthew Brown, Program Manager, NYSERDA

Moderator

Cathy Hobbs, ASID Interior Designer/Stager, TV Host

Speakers

Tracey Wallace, Co-Founder and Chief Financial Officer, Solar Home Factory & Solar Village Company

Joey Larouche, Owner, Upbrella International

Tony Daniels, Founding Principal, Cycle Architecture + Planning

April 28, 2022 | 9 to 10:30 am | 1.5 AIA LU|HSW
Building Energy Exchange | be-exchange.org



NYSERDA

**be
ex**

building
energy
exchange



Downtown Revitalization Initiative

Fingerlakes > Geneva

Round 1 Recipient



Lake Tunnel Solar Village
Zero Energy Modular Development

Who We Are

Developer: The Solar Village Company

Builder: The Solar Home Factory

Woman Owned

Triple Bottom Line Company

Living Wage Employer



Local 840



Locals 276/277

Headquarters and Factory in
Geneva, NY:

- DEC Environmental Justice Community
- NYS Econ. Disadvantaged Community



PV-041616-011465



2000s

Solar Installer

Founders installed
530 solar projects
across 16 states

Over 400 NYSERDA
Incentive Contracts

\$17.4M Total Sales
(5 Years)



Wallace Cabin- Grants, NM 1995

2018

Single Family Modular Manufacturer

Full Volumetric
Construction

Lake Tunnel Solar
Village - 18 Homes

\$5M Total Sales
(2 Years)



650sqft Housing Module in Factory

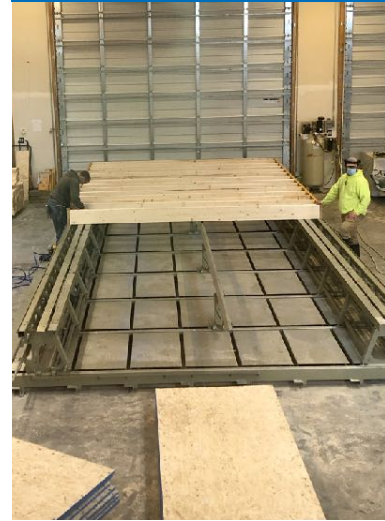
2021

Multifamily Panelized Manufacturer

Retooled for **Walls,
Floors, Ceilings**

Geneva Solar Village
87 Units

\$12.5M Contract



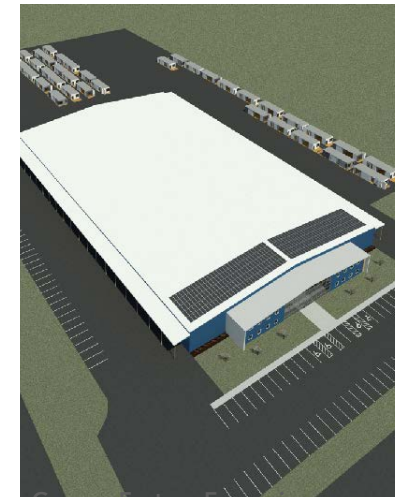
Floor Box Framing Table

2024

Full-Scale Multifamily Modular

200,000sqft
Factory expansion

Large Scale
Multifamily



Geneva Factory Expansion



What is Modular Construction?

Volumetric Modular is the factory assembly of living spaces including finishes. Work is conducted in a controlled environment in a lean manufacturing process. All trades “above the foundation” are 95% complete in factory.



Framing



Millworks



Plumbing



HVAC



Electrical



Solar



What Is Net Zero?

Connected to the Grid, but 100% powered by solar on an annual basis. The buildings are energy efficient and heating/cooling is provided by heat pump systems.



No Electrical Cost



No Heating Cost

Before



After





ROUGH MODULE





TRANSPORT

31 Solar Drive Geneva, NY 14456





SOLAR HOME
FACTORY



THE
SOLAR
VILLAGE
COMPANY





10,000 Watt Solar Array

SIP Walls

Steel Siding

Triple Pane
Windows

Fresh Air
Exchanger

Smart Home
Controls

Air Source
Heat Pump

Factory Built
Zero Energy Modular



Proven **Net Zero**

First Development: 130% Net Positive
Tracked From NYSEG Utility Billing

Top 10

Most Efficient
Home Builders
in USA

Average New Home is **67** HERS

Net Zero is 0 HERS Rating



SHF Module Average **-31** HERS

2020 HERS Rating of Lake Tunnel Solar Village. <https://www.resnet.us/>

RESNET[®]
RESIDENTIAL ENERGY SERVICES NETWORK



THE
**SOLAR
VILLAGE**
COMPANY



183' W x 53' D



100% Net Zero Energy Use
Grid-Tied Solar Power



Triple-pane
Windows



Energy / Water
Use Monitoring



A 12x 3 Bed
B 12x 1 Bed and 6x 3 Bed
C 24x 1 Bed



Off-Grid / Storm Mode
Lighting, Heat, Refrigeration

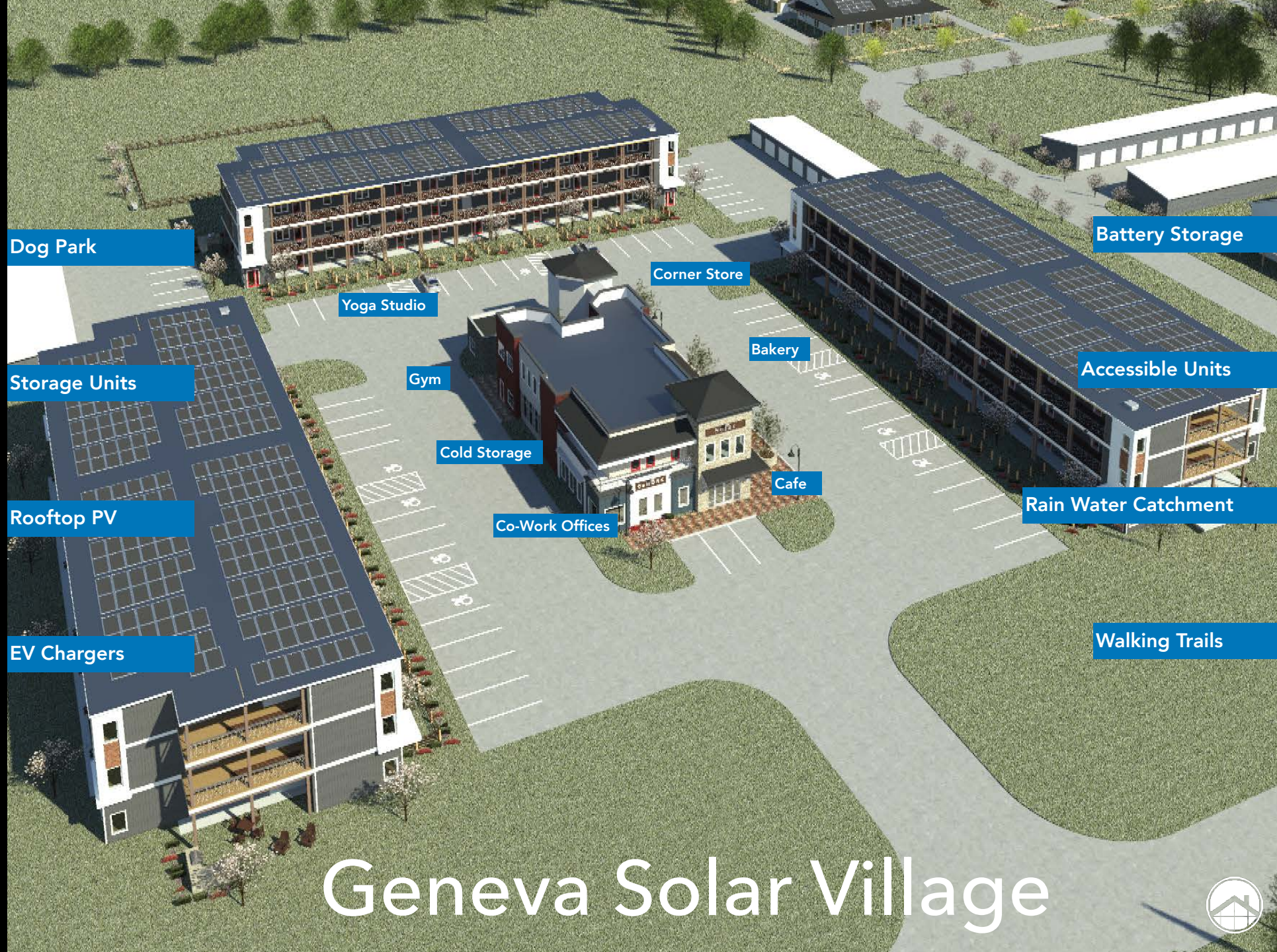


High Efficiency
Air Conditioning
Heat Pumps

Solar Apartments

High Performance Building Net Zero Energy Use





Geneva Solar Village





**Buildings of
Excellence**



**Community
Preservation
Corporation**

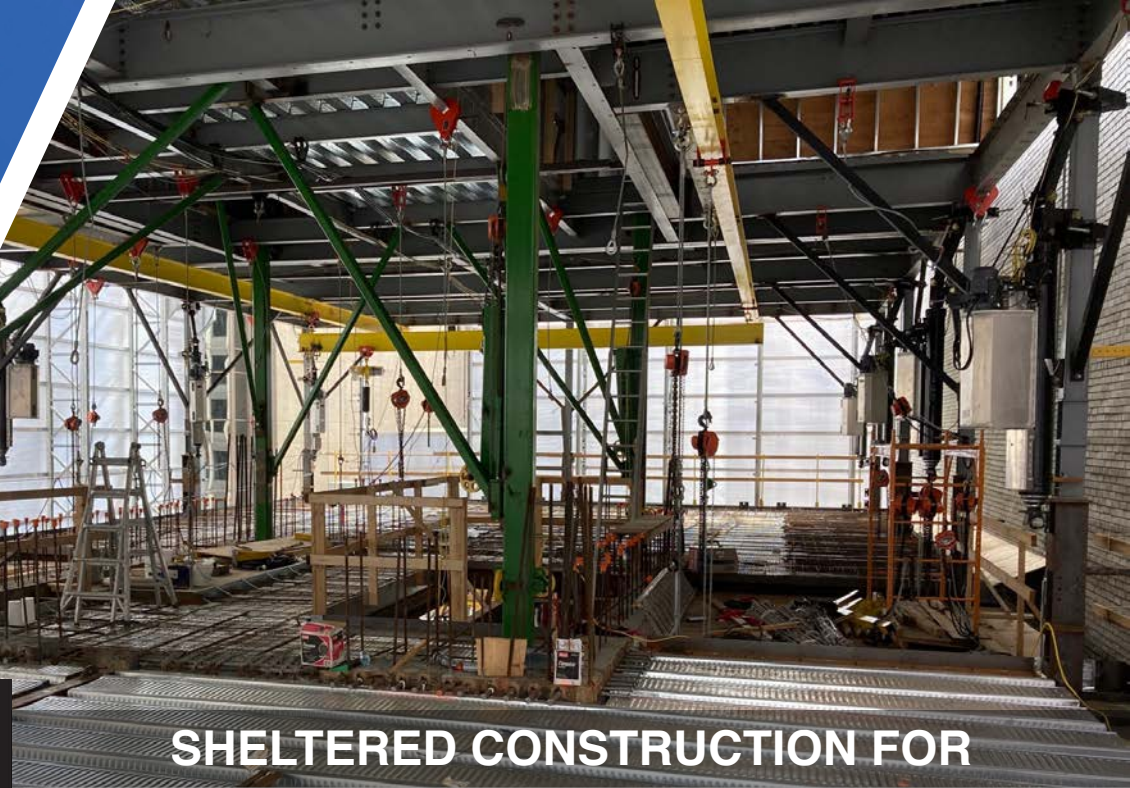


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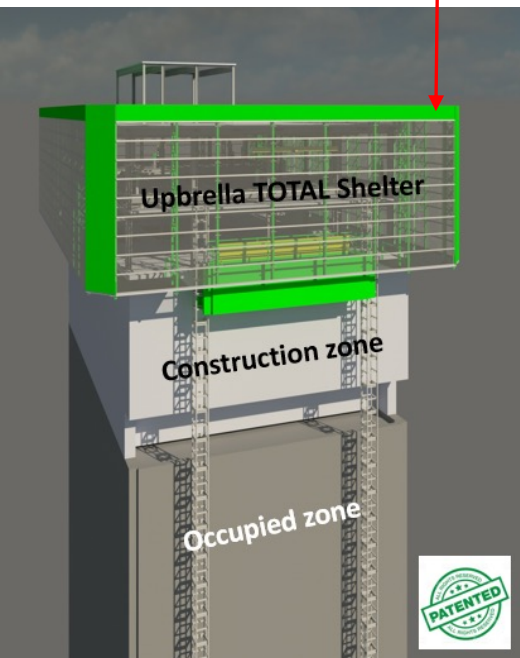


**SHELTERED CONSTRUCTION FOR
ONSITE HIGH-RISE ASSEMBLY**



UPBRELLA: WE START WITH THE ROOF!

The final roof !
As soon as there is a floor
shape to repeat.



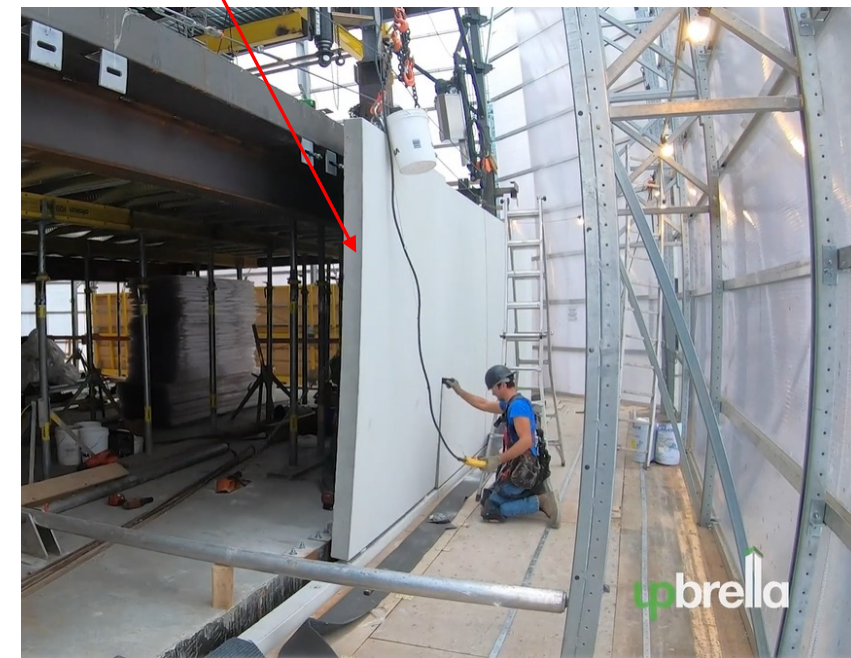
Add a protective enclosure!
To protect building, workers
and neighbors.



Industrial handling!
For all tasks, all workers, at all time!
And to lift the roof and shelter.



Prefabrication at human scale!
Reduce resources wastage and
maximize the 'hive' efficiency.



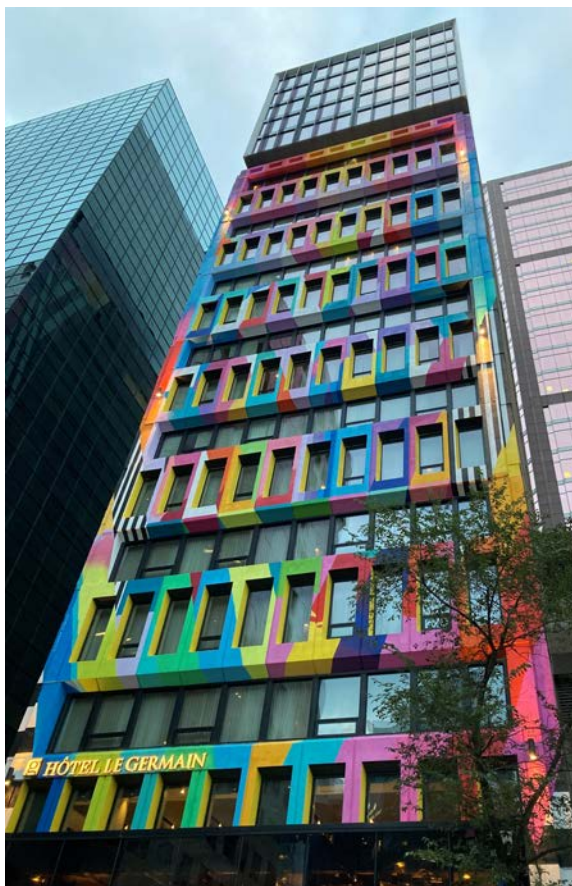
Patented
in 15
countries

THE ROOF/SHELTER IS LIFTED FLOOR BY FLOOR AS THE WORK PROGRESSES INSIDE
EQUIPMENT IS FULLY REUSABLE FROM ONE PROJECT TO THE OTHER

USING THE FINAL ROOF WITH A SHELTER REDUCES ENERGY



UPBRELLA GROWS BUILDINGS – DEMO OF A 6-STOREY ADDITION (2019)



TIMELAPSE VIDEO : https://www.youtube.com/watch?v=pZ_MEVISMVI

Le Germain Montreal
6 floors added on existing 17 Floor building
(December 2018 to June 2019)

Demonstration of

Limited public occupancy
Installation above existing
Ultra light hybrid superstructure
Team expertise and creativity

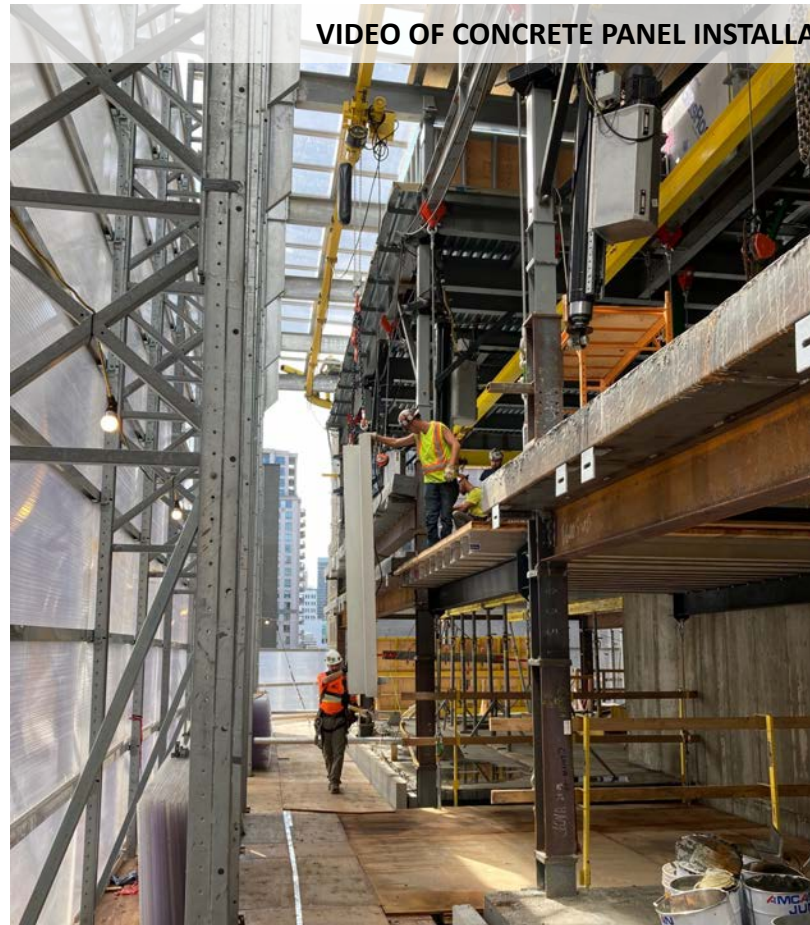
VERTICAL ADDITION TO REDUCE DEMOLITION



HYBRID STRUCTURE WITH HUMAN SCALE PREFABRICATION



2025 Peel St. Montreal
Hybrid superstructure
Concrete prefab exterior walls



VIDEO OF CONCRETE PANEL INSTALLATION : <https://vimeo.com/626810511>

Demonstration of



On-site Industrial Material handling
Upprella system performance
System complete and reliable
Shelter Quality

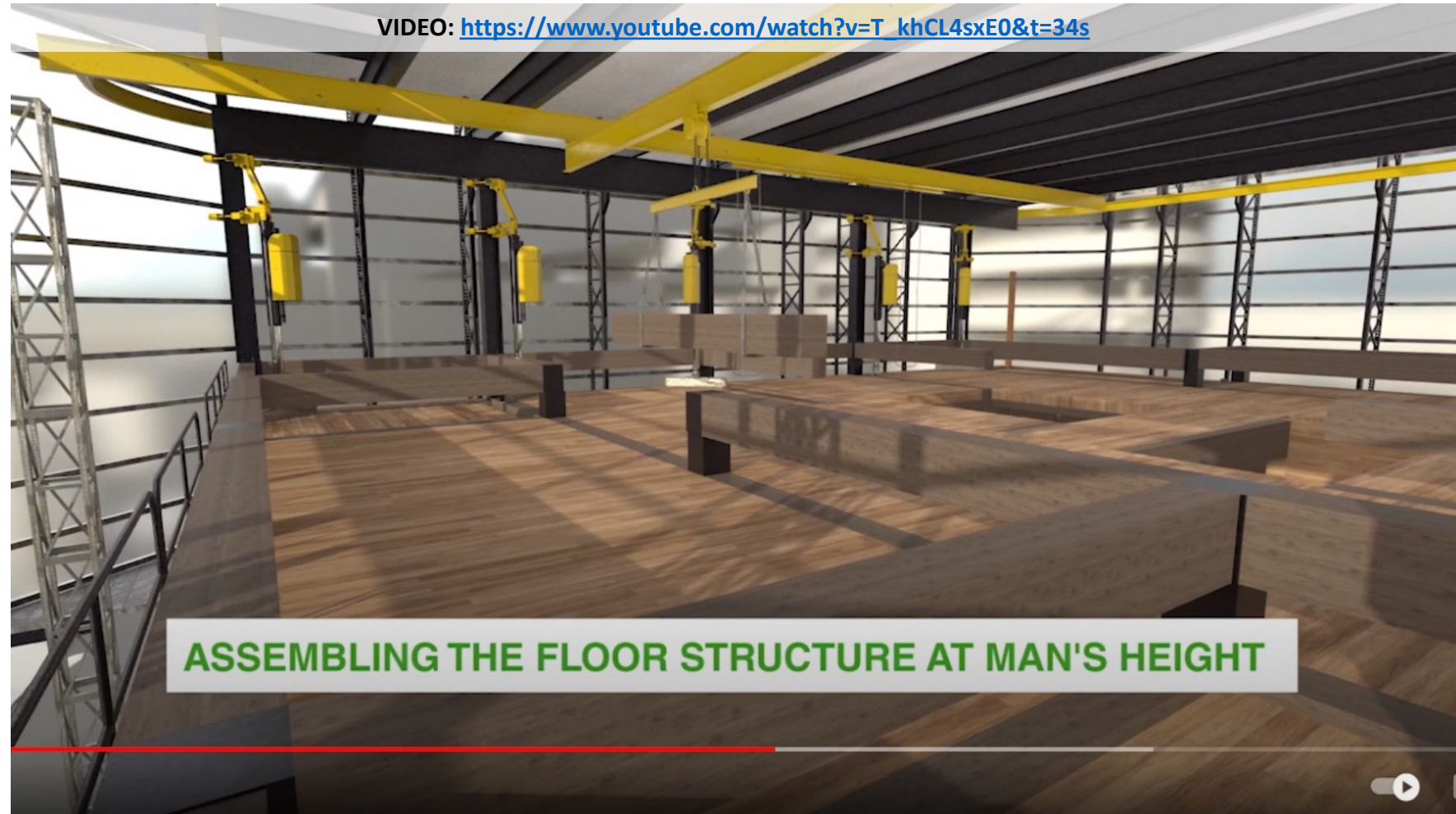
HYBRID STRUCTURES SAVE MATERIALS



UPBRELLA SHELTERS FOUNDATIONS – INTERNATIONAL CLT DEMO



Tower Carmelha, Monaco
CLT/Mass Timber
(2021-2022)



Demonstration of

BEYOND NET ZERO

Exportability (COVID timing)
Noise reduction (28dB)
Applicable for foundations
CLT structure compatibility



UPBRELLA FACADE RENOVATION – INTRODUCTION IN 2022



FEATURES AND BENEFITS :

**2X
FASTER**

- No scaffoldings, No tower cranes and reduced ground disturbances
- Best shelter protection facilitating air and noise control
- Peripheral work platforms and monorail handling to increase productivity
- Mast climber(s) / construction elevator(s) for external materials and workers
- Helps continued occupancy of the building during façade works

IDEAL FOR ENERGY RETROFITS

**NYC
LOCAL
LAW 97
READY !**



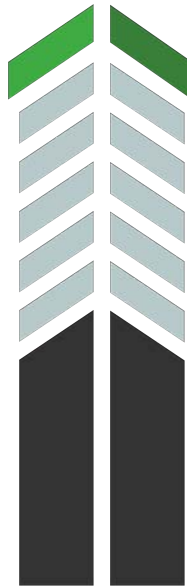
PRODUCT APPLICATIONS WITH REUSABLE EQUIPMENTS

2016



New builds

2019



Vertical
additions

2022



Facade
retrofits

2024



Deconstruction and
Reusability

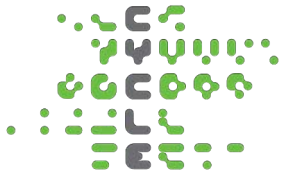
**SPEED
QUALITY
SAFETY
GREEN**

UPBRELLA FOR ALL STEPS OF THE BUILDING LIFE CYCLE : <https://www.youtube.com/watch?v=BEDObB1eBx4>



Understanding Deep Energy Retrofits

Can we get there from here?



Tony Daniels, RA, principal
Cycle Architecture, PLLC
Tony@c-ap.net

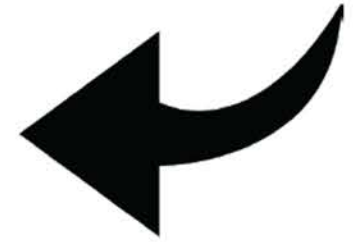
Caitlin Martusewicz, partner
Cycle Architecture, PLLC
Caitlin@c-ap.net

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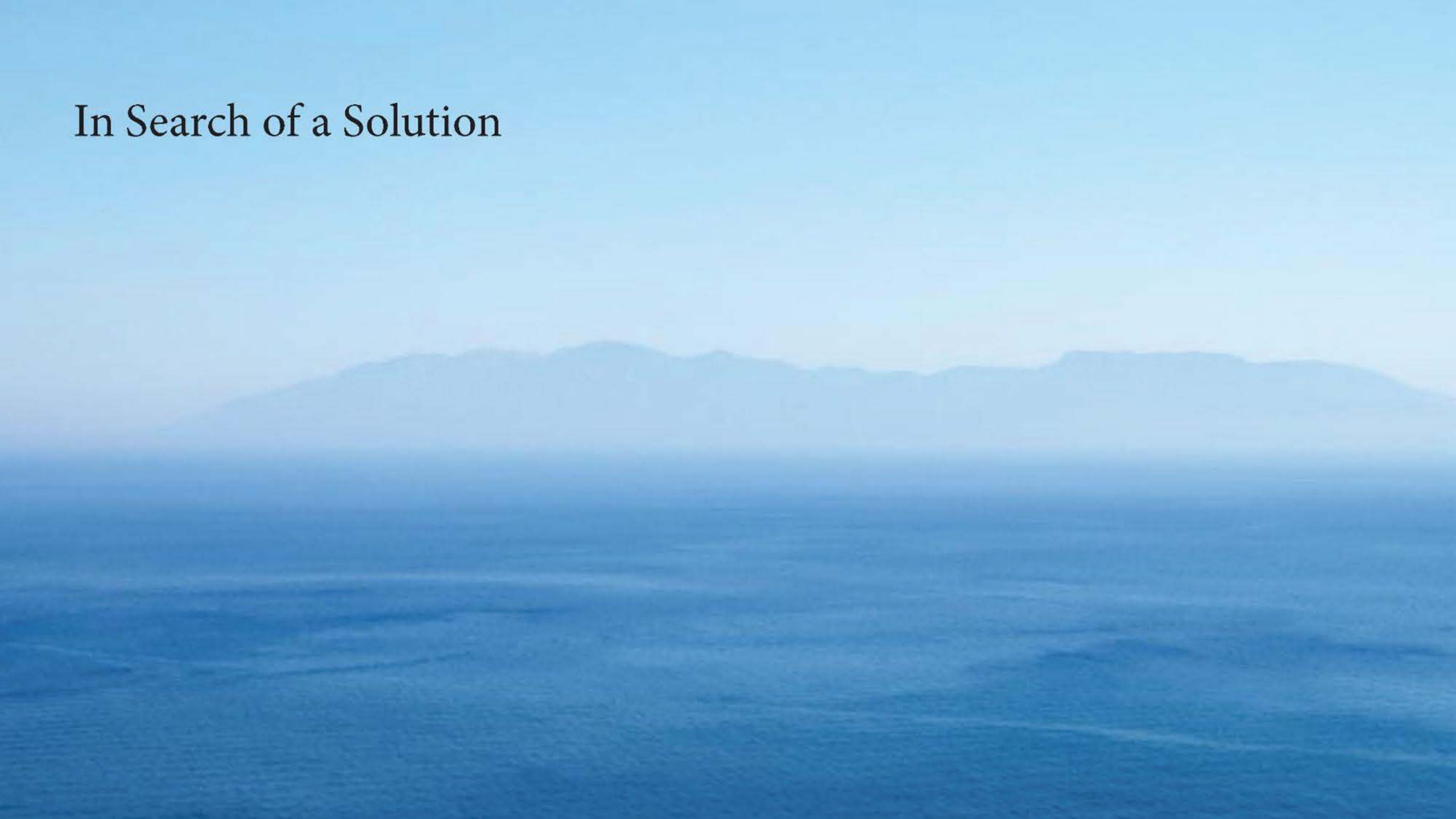
**Thursday
Apr 28th, 2022**



Hey Architect!
Retrofit THIS



In Search of a Solution



What Characterizes a Solution?

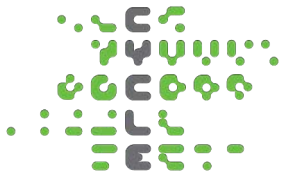
Predictability

Decision Makers need to know what they are in for, and what they will get

- Capital Cost
- Schedule
- Permitting
- Energy Savings/NOI
- Maintenance Obligations



<https://www.freepik.com/photos/woman> Woman photo created by cookie_studio - www.freepik.com



What Characterizes a Solution?

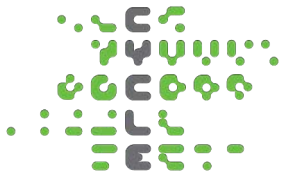
Repetition

Until we are masters of 3d printing every component, we have to rely on current industrial assembly processes (e.g. robotics, assembly line, etc.)

- Offsite Assembly
- Economies of Scale
- Integrated with Logistics
- Quality Control Procedures
- Maintenance Obligations



<https://www.freepik.com/vectors/isometric-elements> > Isometric elements vector created by macrovector - www.freepik.com



What Characterizes a Solution?

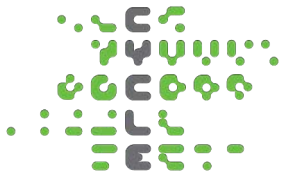
Standardization

Leverage modularity, common components, automate design and calculation

- Building Codes, Inspections and Testing
- Rote Engineering
- Insurance
- Open Market
- Innovation/Improvement



<https://www.freepik.com/photos/construction-engineer> Construction engineer photo created by mego-studio - www.freepik.com

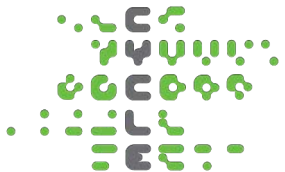
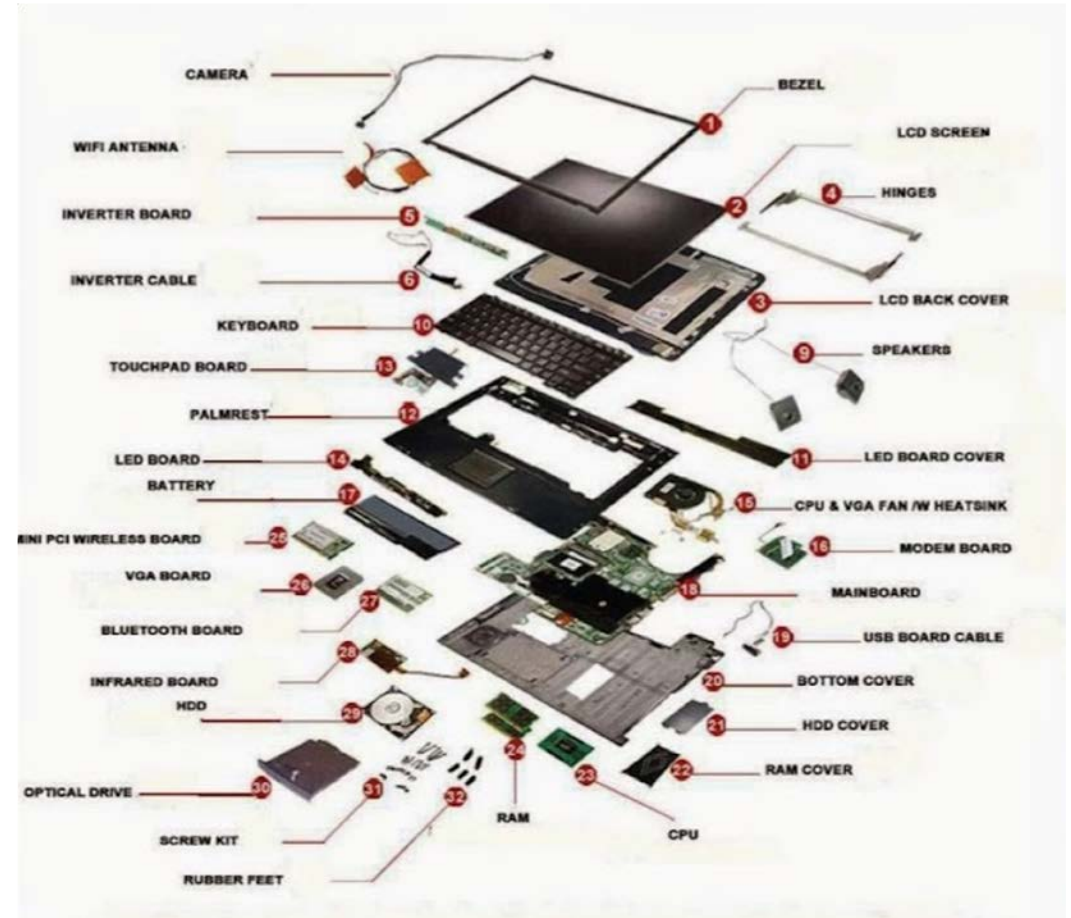


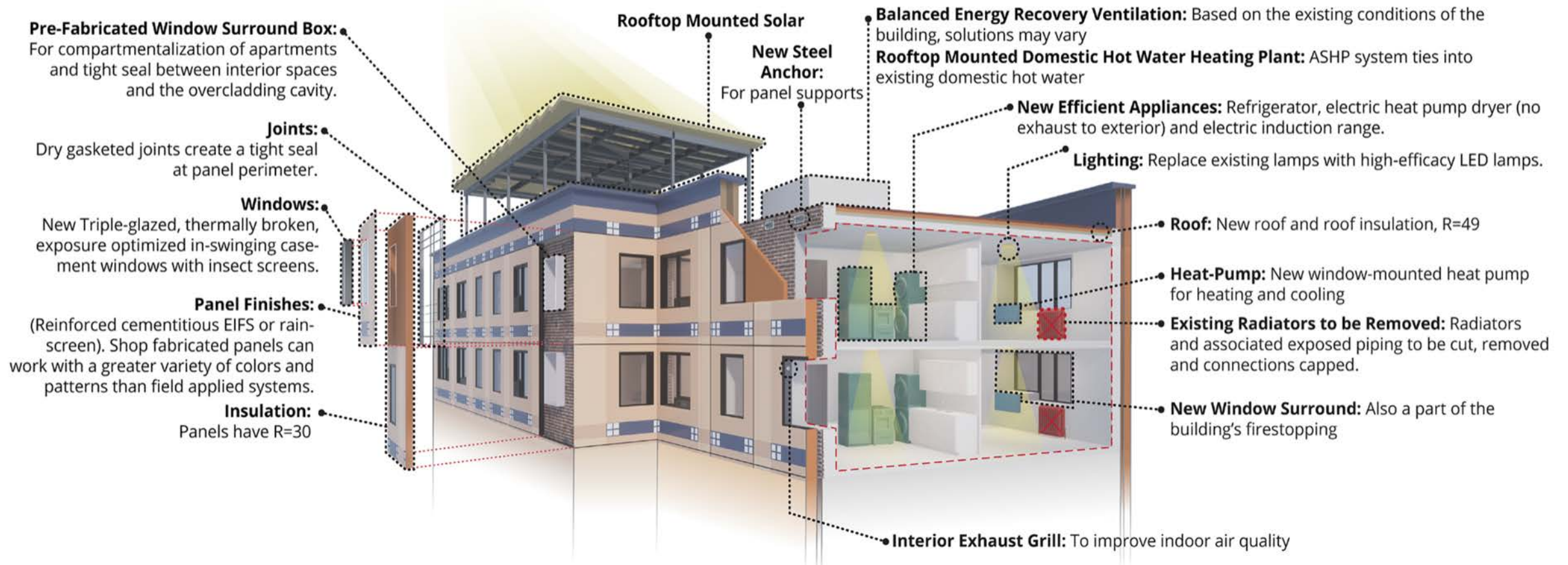
What Characterizes a Solution?

Specialization

The right piece in the right place.

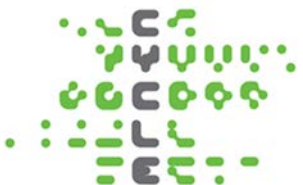
- Each component is part of the whole
- Each component may have its own source.
- Applicable especially for retrofits





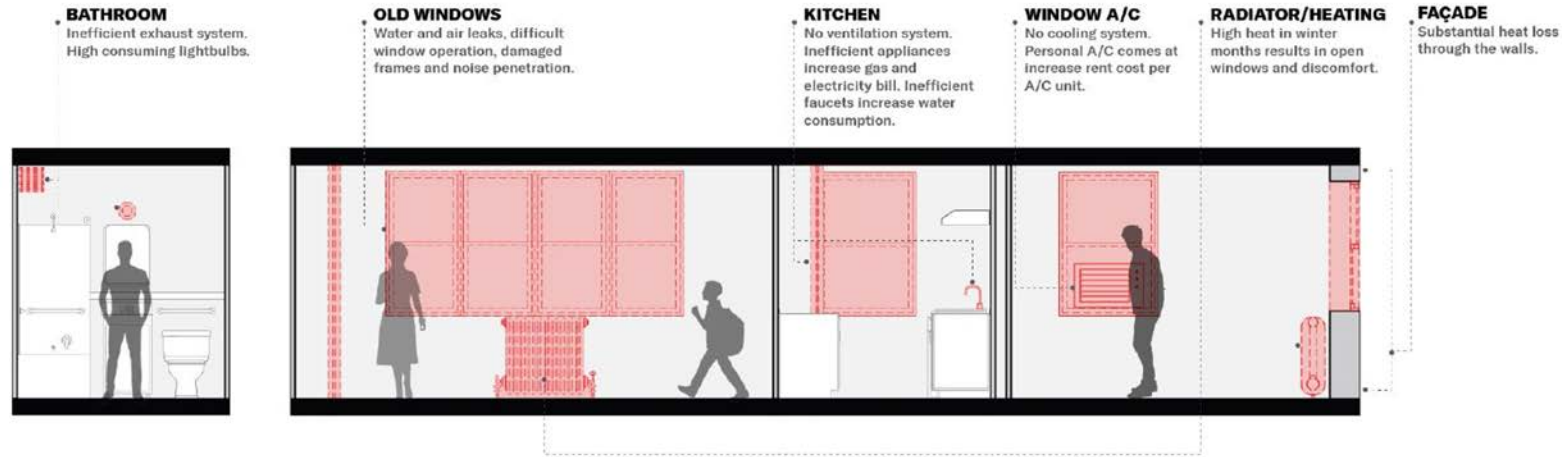
Elements of a Typical Deep Energy Retrofit

- Existing Buildings are energy inefficient, and often poorly maintained
- Retrofits seek to radically reduce energy consumption at a building and can meet Passive House standards.
- Retrofits are big projects - not just weather-proofing and repairs

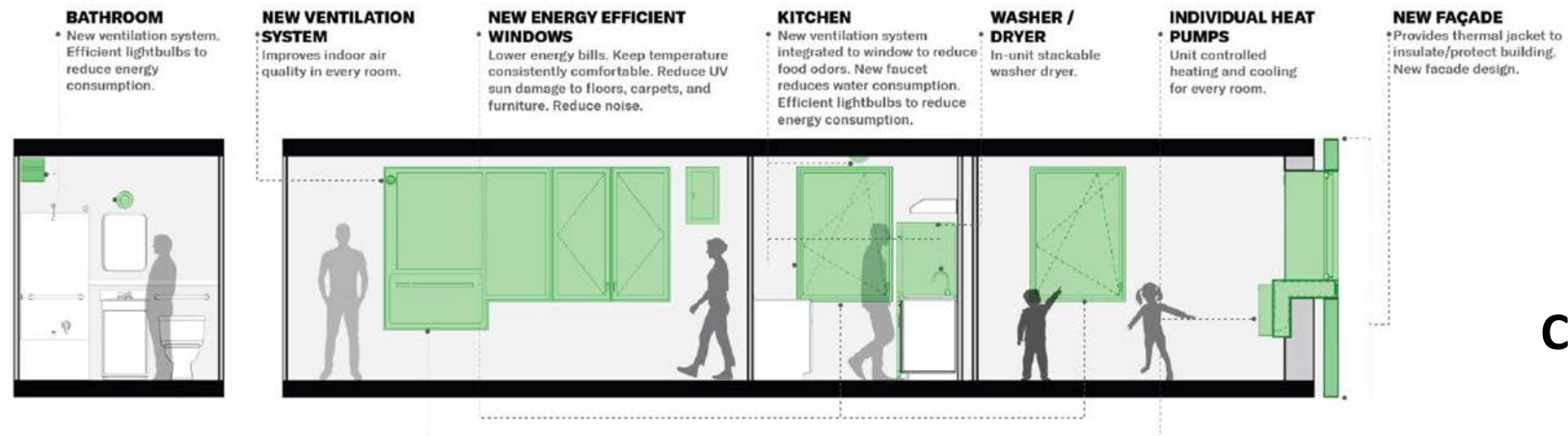


In-Unit Changes

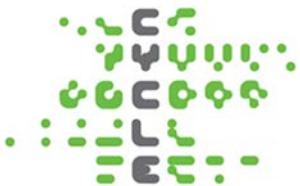
Current Building



RetrofitNY Renovations



Communicating
Change



Building Envelope - Facade

Manufacturers / Capabilities



Panelized Overcladding System

- Increased insulation values
- Factory Assembled
- Lifted into place and installed onto the facade of the building

Heating and Cooling Systems

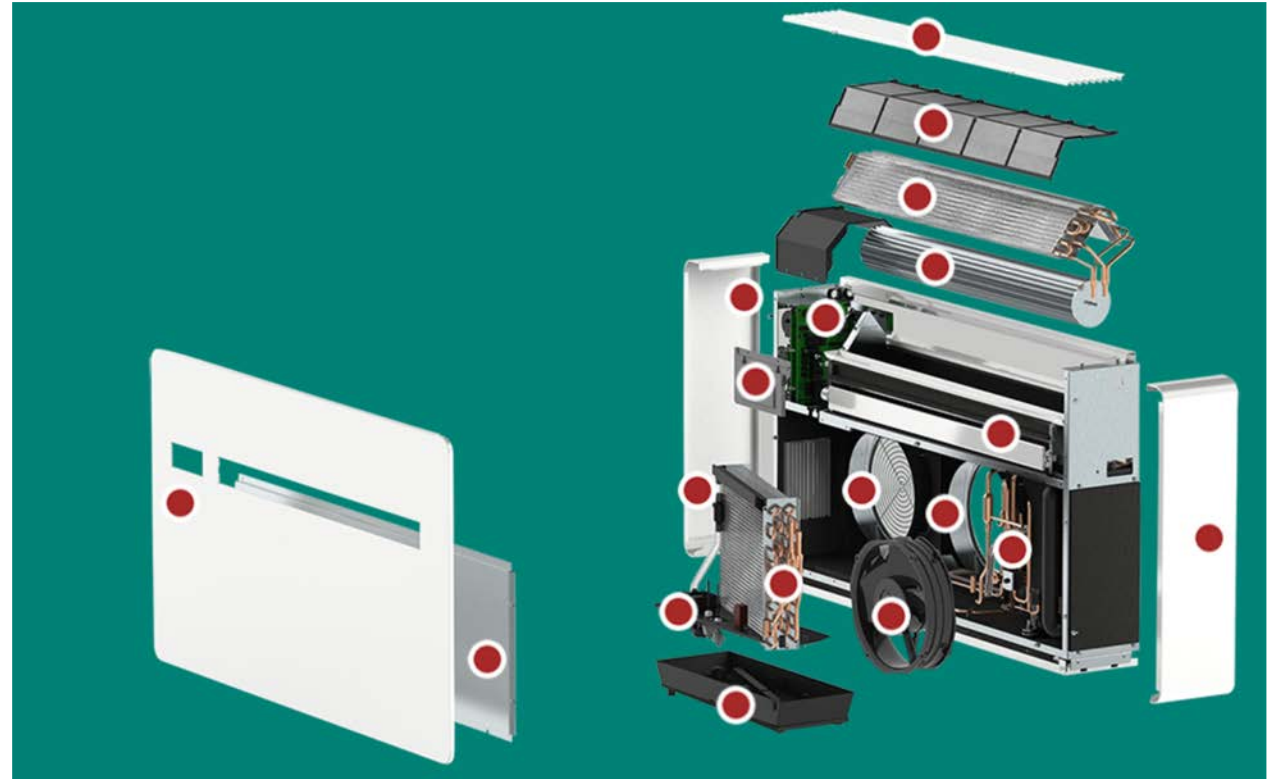


Available Technology and Unitized Systems

Heating and Cooling Systems



Unitized Packaged Heat Pump - All Electric



Domestic Hot Water Heating



Air Source Heat Pump

- CO2 refrigerant - least GWP
- 1 for 1 replacement of existing fossil fuel fired hot water boiler.
- Connects to existing water distribution system

Equitable

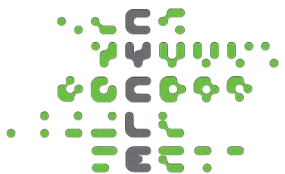


- Reduce Site Disruption
- Avoid work within people's homes
- People remain in their homes
- Qualitative Improvements
- Work with the building you have





Thank You



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discuss.
send questions via Zoom Q+A

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